A Behavioral Approach to Depression

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Essential Papers on Depression

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The purpose of this paper is threefold: (1) to explicate the major theoretical assumptions and premises that have been guiding the design of our research; (2) to present our empirical findings, which are consistent with these assumptions; and (3) to describe studies now in progress that are designed to test hypotheses about the relationship between positive reinforcement and depression. Intervention strategies that have been found useful for the treatment of depressed individuals within a behavioral framework have been presented elsewhere (Lewinsohn, Shaffer, & Libet 1969; Lewinsohn, Weinstein, & Shaw 1969; Lewinsohn & Atwood 1969; Lewinsohn & Shaw 1969; Lewinsohn, Weinstein, & Alper 1970;

Lewinsohn & Shaffer 1971; Johannson, Lewinsohn & Flippo 1969).

OPERATIONAL DEFINITION OF DEPRESSION AND A METHODOLOGICAL POINT

We use the term "depression" to refer to the syndrome of behaviors that have been identified in descriptive studies of depressed individuals (e.g., Grinker, et al., 1961). It includes verbal statements of dysphoria, self-depreciation, guilt, material burden, social isolation, somatic complaints, and a reduced rate of many behaviors. We assume depression to be a continuous variable which can be conceptualized as a "state" which fluctuates over time as well as a "trait" (some people are more prone to becoming depressed than others). Being depressed does not exclude other psychopathological conditions such as schizophrenia, psychosis, sexual deviation, or alcoholism. For research purposes a patient

(subject) is defined as "depressed" if he meets certain experimental criteria (e.g., Lewinsohn & Libet 1972) based on selected MMPI scales and on the interview factors identified by Grinker (1961).

It would seem important that any study relying on differences between depressed and nondepressed *groups* for its conclusions have a normal control as well as a "psychiatric control" group (i.e. patients for whom anxiety or other neurotic symptoms but not depression constitute the major psychopathology) if any observed group differences are to be attributed to depression (depressed ≠ psychiatric control, normal) and not to the deviation hypothesis (depressed, psychiatric control ≠ normal control).

THE MAJOR ASSUMPTIONS OF THE BEHAVIORAL THEORY OF DEPRESSION

We make the following three assumptions: (1)

A low rate of response-contingent positive reinforcement (resconposre) acts as an eliciting (unconditioned) stimulus for some depressive behaviors, such as feelings of dysphoria, fatigue, and other somatic symptoms. (2) A low rate of resconposre constitutes a sufficient explanation for other parts of the depressive syndrome such as the low rate of behavior. For the latter the depressed person is considered to be on a prolonged extinction schedule. (3) The total amount of resconposre received by an individual is presumed to be a function of three sets of variables: (a) The number of events (including activities) that are potentially reinforcing (PotRe) for the individual. PotRe is assumed to be a variable subject to individual differences, influenced by biological (e.g., sex and age) and experiential variables, (b) The number of potentially reinforcing events that can be provided

by the environment, i.e., the availability of reinforcement in the environment (AvaiRe). (c) The instrumental behavior of the individual, i.e., the extent to which he possesses the skills and emits those behaviors that will elicit reinforcement for him from his environment.

A schematic representation of the theory is shown in Figure 1.

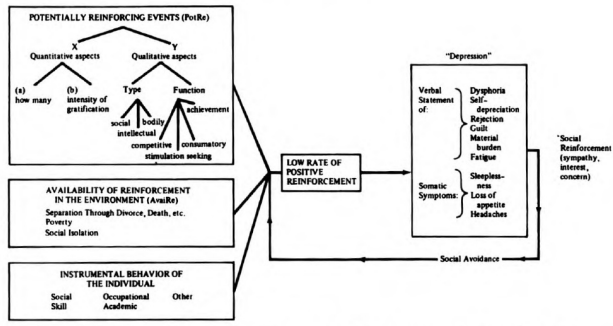

Figure 1. Schematic representation of the causation and maintenance of "depressive" behavior.

The behavioral theory requires that (a) the total amount of resconposre received by

depressed persons be less than that received by nondepressed persons, and similarly, it will be less when the individual is depressed than when he is not depressed; (b) the onset of depression be accompanied by a reduction in resconposre; (c) intensity of depression covary with rate of resconposre; and (d) improvement be accompanied by an increase in resconposre. Before proceeding to an examination of relevant empirical studies several additional clarifications and hypotheses are offered.

First, even were such predictions affirmed, further data would be needed to ascertain whether the differences between depressed and non-depressed individuals in regard to resconposre are due to: (a) differences in the number and kinds of activities and events which are potentially reinforcing (PotRe); (b) and/or the possibility that depressed individuals may be

more likely to be in situations which lack reinforcement for them (AvaiRe); (c) and/or differences between depressed and non-depressed individuals in those skills which are necessary to obtain reinforcement from one's environment.

Second, the degree to which the individual's behavior is maintained (followed) by reinforcement is assumed to be the critical antecedent condition for the occurrence of depression, rather than the total amount of reinforcement received. It is a well-known clinical fact that "giving" (i.e., noncontingently) to depressed individuals does not decrease their depression. We assume that the occurrence of behavior followed by positive reinforcement is vital if depression is to be avoided. We predict depression when the probability is low that the individual's behavior will be followed by

reinforcement, and also when the probability is high that the individual will be "reinforced" when he does not emit the behavior (e.g., the retired person receiving his paycheck regardless of what he does). Under both conditions the probability of the individual emitting behavior is reduced.

BEHAVIORAL VIEW OF OTHER ASPECTS OF DEPRESSION

1. *Low self-esteem, pessimism, feelings of guilt, and other related phenomena.* These cognitive changes are commonly observed in depressed individuals, even though the specific manifestations vary considerably from individual to individual. Thus there are depressed patients who do not have low self-esteem and there are many who lack feelings of guilt. Theorists such as Aaron T. Beck (1967) assign primary causal significance to these cognitive changes. A behavioral theory assumes these to be secondary

elaborations of the feeling of dysphoria, which in turn is presumed to be the consequence of a low rate of resconposre. The first thing that happens when an individual becomes depressed is that he is experiencing an unpleasant feeling state (dysphoria). He *is* feeling bad. This feeling state is difficult for the individual to label and a number of alternative "explanations" are available to him including, "I am sick" (somatic symptoms), "I am weak or otherwise inadequate" (low self-esteem), "I am bad" (feelings of guilt), or "I am not likeable" (feelings of social isolation). The research of Stanley Schachter (Schachter & Singer 1962) may contain important implications for this aspect of the behavior of depressed individuals and for treatment as well (cognitive relabeling). If the depressed individual can be helped to relabel his emotion (e.g., "I am worthless" into "I am feeling bad because I am lacking something that is

important to my welfare"), he may be in a much better position to do something about his predicament.

2. Relationship between hostility and depression. The role of hostility which is so central to psychodynamically-oriented theories of depression (i.e., depression is caused by internalized hostility) is hypothesized to be secondary to the low rate of resconposre. In a manner analogous to the way in which aggressive behavior is elicited by an aversive stimulus in Azrin's (1966) studies, aggressive behavior may be assumed to be elicited by a low rate of resconposre in the depressed individual. When these aggressive responses are expressed, they serve to alienate other people and therefore contribute even further to the social isolation of the depressed individual. He therefore learns to avoid expressing hostile tendencies by

suppressing (or repressing) them.

3. Role of precipitating factors in occurrence of depression. In a substantial number of depressed patients, the depression can be shown to have begun after certain environmental events (e.g., Paykel, et al. 1969). Many of these events involve a serious reduction of positive reinforcement in that the event deprives the individual of an important source of reinforcement (e.g., death of spouse) or of an important set of skills (e.g., spinal cord injuries or brain disease). The relationship between the occurrence of such events and depression is consistent with the behavioral theory of depression. There are, however, also instances of depression following "success" experiences (e.g., promotions or professional success). It is also not at all uncommon for an individual to become depressed following the attainment of some important and long-sought

goal (e.g., award of Ph.D. degree). The existence of such precipitating factors would seem at first glance to contradict the notion of a relation between a reduction in positive reinforcement and depression. Two considerations would seem relevant: (a) That the individual is judged to be a "success" by external criteria (e.g., is promoted), does not necessarily mean that the number of potentially reinforcing events available to him has increased. Thus, for example, a promotion may *actually* involve a serious reduction in the amount of social reinforcement obtained by the individual, (b) The behavioral theory would predict depression for an individual who attains a goal for which he has worked long and hard *if* the reward (e.g., award of degree) turns out to be a weak reinforcer for him. In that case he has worked hard for little; i.e., his rate of resconposre is low.

EMPIRICAL FINDINGS CONSISTENT WITH THE

THEORY AND STUDIES IN PROGRESS

Relationship Between Rate of Positive Reinforcement and Depression

A critical test of the major hypothesis requires a two-step strategy. (1) One must first functionally identify events that act as reinforcement for individuals who may be characterized as either depressed, psychiatric controls, or normal controls, and (2) one must then compute the rate of response contingent reinforcement for these subjects. Holding activity level constant, the theory predicts a lower rate of reinforcement for the depressed individuals. This crucial test has not so far been performed, but a study now in progress with Julian Libet based on home observation and group interaction data will do just that.

Another prediction derived from the theory will be tested in a study being conducted by Douglas MacPhillamy and the author which will

compare the total amount of positive reinforcement received by depressed and nondepressed subjects. The operational measure of "total amount of positive reinforcement obtained" for this study will be represented by the sum of the products of the intensity and frequency ratings for each of the 320 items of the Pleasant Events Schedule (MacPhillamy & Lewinsohn 1971). (The Pleasant Events Schedule consists of 320 events and activities which were generated after a very extensive search of the universe of "Pleasant Events." The Ss are asked to rate each item in the schedule on a three-point scale of pleasantness and again on a three-point scale of frequency of occurrence.)

To date the results of several studies are consistent with the major tenet of the behavioral theory of depression, i.e., that there is an association between rate of positive reinforcement

and intensity of depression. First, depressed individuals elicit fewer behaviors from other people than control subjects (Shaffer & Lewinsohn 1971; Libet & Lewinsohn 1973). Assuming that it is reinforcing to be the object of attention and interest, this finding suggests that depressed persons receive less social reinforcement. The studies forming the basis for this conclusion are discussed in greater detail below. There is also a significant association between mood and number of "pleasant" activities engaged in (Lewinsohn & Libet 1972).

Three groups of ten subjects (depressed, psychiatric controls, and normal controls) were used. Subjects rated their mood on the Depression Adjective Check List (Lubin 1965) and also indicated the number of "pleasant" activities engaged in each day on a check list over a period of 30 days. The correlation between the mood

ratings and the activity scores was computed separately for each subject. The null hypothesis of no association between mood and pleasant activities was strongly rejected *(t* = 9.3, *df* = 29, *p* < .001). There were large individual differences with respect to the magnitude of the correlations between mood and activity, the highest correlation being—.66. For 10 of the 30 subjects, however, the correlation was not significantly different from 0. Future research might address itself to the hypothesis that there are important individual difference variables moderating the relationship between mood and activity.

Depressed individuals have a significantly larger number of events associated with their mood (Lewinsohn & Libet 1972). The number of activities negatively correlated (at the .05 level of statistical significance) with mood ratings was counted for each subject. The depressed group had

a significantly larger number of mood-related activities than the psychiatric and normal control groups *(F* = 7.67, *df* = 2/24, *p* < .05). Also, the correlation between depression level (as measured by the MMPI D scale) and the number of "related" activities was computed across all subjects *(N* = 30), and was found to be statistically significant at the .01 level (*r* = .46). The finding suggests a greater vulnerability of depressed individuals to the vicissitudes of everyday experiences, a notion that has been central to a great deal of previous theorizing (Fenichel 1945).

Many of the individual activities that are correlated with mood across subjects involve social reinforcement (Lewinsohn & Libet 1972).

The number of subjects for whom each activity was significantly associated with mood was also tabulated. Those items that correlated with mood

for four or more subjects are listed in Table 1.

Table 1. Rank Order List of Items Correlating More Than .30 with DACL Mood Ratings for at Least Four Persons (From Lewinsohn & Libet 1972)

Items	*No. of Ss* out of 30
Being with happy people	12
Being relaxed	10
Having spare time	9
Laughing	8
Having people show interest in what you have said	8
Looking at the sky or clouds	7
Saying something clearly	6
Talking about philosophy or religion	6
Meeting someone new (opposite sex)	6
Watching attractive girls or men	6
Reading stories or novels	5
Taking a walk	5
Seeing beautiful scenery	5
Sleeping soundly at night	5
Amusing people	5
Having coffee or a coke with friends	5
Having someone agree with you	4
Petting	4
Being with someone you love	4
Traveling	4

Breathing clean air	4
Having a frank and open conversation	4
Having sexual relations with a partner of the opposite sex	4
Watching people	4

An important qualitative aspect of this list appears to be that many of them involve social interactions.

Relation Between PotRe and Depression

Our general hypothesis is that there are qualitative and quantitative differences between depressed and nondepressed groups in regard to the number and kinds of potentially reinforcing events.

Any attempt to study positive reinforcement with human subjects (e.g., determination of the amount of positive reinforcement received by the individual or identification of what are potentially reinforcing events for him) is handicapped by the

fact that there is no psychometrically sound instrument for the assessment of responses to potentially reinforcing events. Direct observation of behavior is very expensive and often practically impossible. The closest equivalent, the Reinforcement Survey Schedule (Cautella & Kastenbaum 1967), was primarily designed to assess the valence of reinforcers potentially available for clinical or laboratory manipulation rather than to provide a systematic survey of the events potentially reinforcing for a given individual. The Pleasant Events Schedule (MacPhillamy & Lewinsohn 1971) was constructed to provide quantitative and qualitative information about what is potentially reinforcing for a given individual. Normative data about the instrument and its psychometric properties and dimensional structure are presented elsewhere (MacPhillamy & Lewinsohn

1971).

The design of a study now under way (MacPhillamy & Lewinsohn) is outlined in Table 2. The general expectation is that depressed and nondepressed groups, and the three age groups, can be discriminated by the number and kind of items rated as pleasant, as well as by the frequency with which the person engages in those activities.

Table 2. General Design of Study of Relationship of PotRe with Depression and with Age

Group		*Depressed*		*Nondepressed Psychiatric*	*Normal Controls*
Age	*Sex*	*Endogenous*	*Reactive*		
20-39	M				
	F				
40-59	M				
	F				
60-79	M				
	F				

In addition to being interested in possible

differences between depressed and nondepressed groups as to potentially positively reinforcing events, we have also been interested in collecting data about the hypothesis that depressed individuals are more sensitive to aversive stimuli (i.e., negative reinforcers) than nondepressed subjects.[2] Since most "real-life" situations contain both positive (approach) and negative (avoidance) components, confirmation of the hypothesis would predict greater avoidance by the depressed individual in many situations. The short-term consequence would be greater isolation and the long-term consequence of less skill acquisition for the depressed individual.

Stewart, in a study conducted in our laboratory (Stewart 1968), hypothesized that "the behavior of depressed subjects is more influenced by the quality (positive or negative) of social reinforcement elicited than is the behavior of

nondepressed subjects" (p. 2). Stewart found that depressed individuals generally had a longer latency of response (operationally defined as the amount of time between the reaction by another person to the subject's verbalization and a subsequent action by that subject in a group situation). The largest differences between depressed and nondepressed subjects were associated with the occurrence of a negative social reaction (e.g., being ignored, criticized, disagreed with).

We have since tried to expand the hypothesis to the autonomic level. Specifically, a study was conducted (Lewinsohn, Lobitz, & Wilson 1973) to test the following predictions:

> H-l: Aversive stimuli elicit a greater autonomic response in depressed subjects.
>
> H-2: Aversive stimuli elicit a greater autonomic anticipatory response in depressed subjects.

H-3: Return to base level following an aversive stimulus is less complete in depressed subjects.

H-4: The autonomic responses of depressed subjects shows less habituation over repeated trials.

The hypotheses about the autonomic reactivity of depressed persons postulate a reaction pattern opposite to that described by Hare (1965) for the psychopath. Psychopaths and depressed individuals are conceptualized as being located at opposite ends of an autonomic response continuum; one is thought to be overresponsive, whereas the other is considered underresponsive to aversive stimuli.

The experimental subjects were classified, using the previously described two-stage selection procedure, into three groups: depressed (D), psychiatric controls (PC), and normal controls (NC). Twelve D, 12 PC, and 12 NC *Ss* were used,

there being an equal number of males and females in each group.

Data were collected during one experimental session which lasted approximately 45 minutes, with the *S* seated in a comfortable chair. The procedure consisted of the following eight standardized steps: (1) The Depression Adjective Check List (DACL) (Lubin 1965) was administered. (2) The GSR electrodes were attached. (3) Partially to allow time for hydration, the *S*s were administered the Subjective Interpretation of Reinforcement Scale (Stewart 1968). The statements from the Subjective Interpretation of Reinforcement Scale had been tape-recorded, and the *S*s were asked to rate their reaction to each one on an 11-point scale with +5 indicating the most pleasant and -5 indicating the most negative reaction. (4) The *S*'s threshold for electric shock delivered to the finger was determined. The

intensity of the shock was controlled by *E* by a calibrated dial which had 10 positions. The Method of Ascending Limits was used to determine each *S*'s threshold. (5) The shock level for the *S* was set at one arbitrary unit above the threshold. The shock apparatus delivered a shock of short duration (approximately 2 msec.) with a spike of approximately 500 volts. Shock was delivered by means of electrodes attached to the index and ring fingers. (6) The *S*s on this and all subsequent shock administrations rated their reactions on an 11-point scale. The mean shock level and the mean subjective shock ratings for the three groups were comparable. (7) In the next phase the *S* was told that *E* would be counting along with an automatic print-out mechanism which was set to print every three seconds. *S* was told that *E* would start with 5 and count down 4-3-2-1-0 and then count up 1-2-3-4-5 and that the *S*

would receive one shock when *E* said “0”. This constituted one trial. (8) The procedure was repeated five times.

Skin resistance was measured by passing a constant 7 microamps of current through the *S*'s hand, using zinc zinc-sulphate electrodes. The resistance was measured directly in K-ohms on a digital volt meter and with a print-out occurring every 3 seconds. Following standard psychophysiologic procedure, the scores were converted into log conductance units.

The autonomic data can be thought of as comprising a 36 x 5 x 11 element three-dimensional matrix where one dimension consists of 36 subjects, the second consists of five trials, and the third consists of 11 count-down measures within each trial. The 36 subjects are nested within two orthogonal factors, groups (D, PC, NC)

and sex (male, female). The study may be conceptualized as a four-factor experiment with repeated measures on two of the four factors, i.e., trials (T) and countdown measures (M) (Winer 1962).

The entire experiment, using identical procedures and *Ns,* was repeated with another group of *S*s (Study No. 2).

Figures 2 and 3 show the groups' mean log skin conductance levels, averaged across all five trials. Points -5 through -2 reflect the anticipatory phase, points - 1 through +1 indicate the *Ss*' response to the occurrence of the shock, and points +2 through +5 reflect the *S*s' recovery.

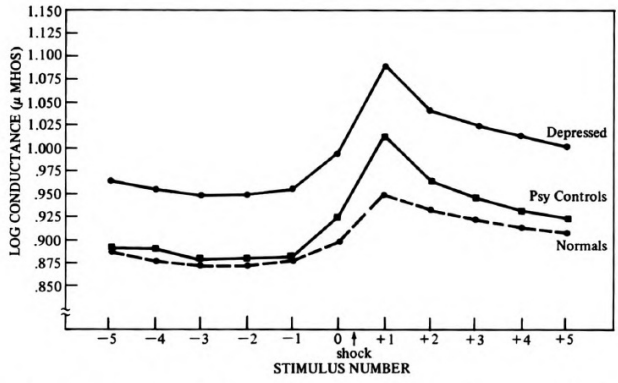

Figure 2. Skin conductance as a function of anticipated shock (shock between 0 and 1) averaged over the five trials. (From Lewinsohn, Lobitz, & Wilson 1973.)

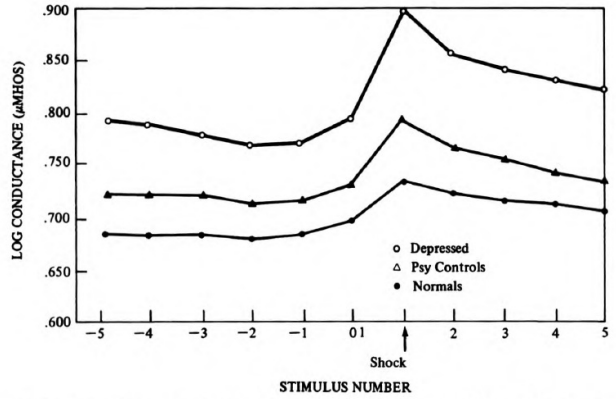

Figure 3. Skin conductance as a function of anticipated shock (shock between 0 and 1) averaged over the five trials (Study 11). (From Lewinsohn, Lobitz, & Wilson 1973).

Results of the ANOVAs for the two studies are shown in Table 3.

Table 3. Results of ANOVAS of Skin Conductance Data for Studies No. 1 and No. 2

		F		*p*	
Source of Variance	*df*	*Study No. 1*	*Study No. 2*	*Study No. 1*	*Study No. 2*
Groups (G)	2	0.5	0.6	NS	NS
Sex (S)	1	0.0	0.1	NS	NS
Trials (T)	4	7.2	23.6	0.01	0.001
Measurements (M)	10	69.5	51.0	0.001	0.001
G x S	2	0.0	0.1	NS	NS
G x T	8	2.3	1.6	0.05	0.20
S x T	4	3.0	8.5	0.05	0.01
G x M	20	1.7	2.2	0.05	0.01
S x M	10	2.4	3.5	0.01	0.01
T x M	40	1.9	2.4	0.01	0.01
G x S x T	8	3.2	0.6	0.01	NS
G x S x M	20	0.6	0.4	NS	NS
G x T x M	80	0.6	0.9	NS	NS
S x T x M	40	1.3	1.2	NS	NS
G x S x T x M	80	0.6	0.8	NS	NS

Our first concern is with the effectiveness of the aversive stimulus in producing *change* in skin conductance. The main effect due to *measurements*

is highly significant in both studies. There is also a significant decrease in skin conductance level as a function of the repeated administration of the experimental procedure *(trials).* It may thus be concluded that the experimental manipulations were successful in eliciting an autonomic response and that adaptation occurred as a function of repeated exposure to the shock.

In both studies the overall skin conductance level is highest (suggesting greater arousal) for the depressed *S*s. Due to large differences in conductance level between *S*s within the groups, however, the differences between groups do not attain statistical significance.

Hypotheses 1, 2, and 3 demand greater *change* on the part of the depressed group during the anticipatory phase, in response to the shock, and during the recovery phase. The interaction of

Groups x Measurements is statistically significant in both studies. To explicate the basis for this interaction, the three time segments, i.e., anticipatory phase (-5 through -2), response to shock (- 1 through +1), and recovery phase (+ 2 through +5), were subjected to separate ANOVAs. The results suggest that, contrary to H2, the depressed 5s do not show a greater anticipatory response in Study No. 1 ($F < 1$) and actually decrease slightly in skin conductance during this period in Study No. 2 *(*$F = 2.7$, $df = 6, 90$, $p < .02$). Consistent with H(, depressed 5s show a greater increase in skin conductance in response to the shock ($F = 1.8$, $p < .2$; $F = 2.9$, $p < .05$, for Studies 1 and 2 respectively). Contrary to H3, there is a slight tendency for the normal control group to show less change in skin conductance during the recovery phase, but the differences between groups do not attain statistical significance.

There was a significant Groups x Trials interaction in Study No. 1(F = 2.3, df = 8, 120, p < .05). However, this interaction is caused by the fact that both the depressed and the psychiatric control groups show less adaptation than the normal control group. The marginally significant Groups x Trials interaction in Study No. 2 is caused by the fact that the psychiatric control group adapts less than the other two groups.

The statistically significant Groups x Sex x Trials interaction in Study No. 1 is also relevant to H4. Inspection of the data indicates that the female depressed *S*s adapt less than the psychiatric and normal *S*s, but this effect is not revealed in the data for males. This triple interaction, however, is not replicated in Study No.2.

Taken in their totality, the findings provide strong support for H1. In both studies the

depressed group was found to be more responsive to the aversive stimulus. Our results are consistent with those obtained by Zuckerman, Persky, and Curtis (1968), who also found that greater autonomic responsivity to a different aversive situation, namely the Cold Pressor Test, was associated with depression. Within the limits of these experimental manipulations and measurements, the results also suggest that the greater sensitivity of the depressed individual is restricted to the actual occurrence of the aversive stimuli and does not extend backward or forward in time.

Even though three out of the four predictions were not confirmed, the fact that the depressed individuals respond more to an aversive stimulus would still lead one to expect them to show a greater tendency to avoid and to withdraw from unpleasant situations. Hence, desensitization to

aversive situations may be therapeutically useful with depressed individuals. The findings also suggest the hypothesis that the increased latency of response following the incidence of a negative social reaction from another person found in Stewart's study (1968) may be due to the emotional disruption experienced by the depressed individual in situations involving negative consequences.

Relationship Between Social Skill and Depression

In testing the hypothesis about the instrumental behavior of depressed individuals, we have tended to focus on social skill. The general hypothesis has been that depressed persons as a group are less socially skillful than nondepressed individuals. It is conceivable and not incompatible with the above that depression further reduces the person's social skill.

The first study of the social skill hypothesis was conducted by Rosenberry and coworkers (1969). The hypothesis being tested was that the depressed person's *timing* of social responses is deviant. In the experiment, subjects listened to tape-recorded speeches and responded by pressing a button whenever they would normally say or do something to maintain rapport with the speaker. The depressed subjects, as a group, responded less predictably and less homogeneously than did the control group.

Another unpublished study (Lewinsohn, Golding, Johannson, & Stewart 1968) had subjects talking to each other via teletypewriters. Pairs of subjects took turns talking to each other and each subject could say as much or as little as he wanted to before ending his turn. Subjects from two groups, depressed and nondepressed, were randomly assigned to one of three types of dyadic

pairings; depressed-depressed; depressed-normal; normal-normal. Each pair of subjects was tested in front of the teletype machines. The subjects were able to communicate with each other via the teletypewriters, which were connected through a wall between the two rooms in which the subjects were seated. There was thus no visual contact between the subjects and they were unable to talk to each other except via the teletypewriters. For all subjects the number of words typed per person increased over the 45-minute session, but for depressed subjects the increase in output was much less than for nondepressed subjects ($F = 3.86$; $df = 1, 26$; $p < .05$ for one-tailed test). The data are graphically shown in Figure 4.

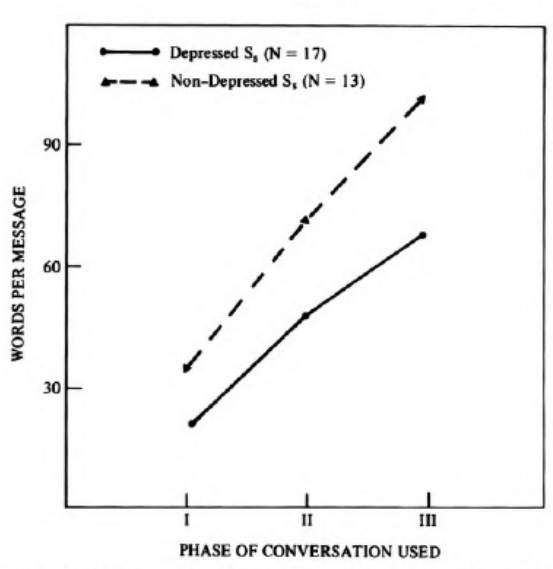

Figure 4. Mean number of words used for the initial, middle and final two messages by depressed and nondepressed subjects. (From Lewinsohn, Golding, Johansson, & Stewart 1968.)

We have since then been concerned with more systematic comparisons between the interpersonal behavior of depressed and nondepressed individuals in small group situations and in the home.

Operational Measures of Social Skill

Social skill is defined as the ability to emit behaviors that are positively reinforced by others. This definition involves sequences of behavior consisting of actions emitted by an individual together with the reactions he elicits from the social environment. An individual is considered to be skillful to the extent that he elicits positive (and avoids negative) consequences from the social environment. A behavior sequence may elicit positive reactions in situation *A* but not in situation *B.* A second behavior sequence may elicit positive reactions in situation *B* but not in situation *A.* The socially skillful individual is the one who emits sequence 1 in situation *A* and sequence 2 in situation *B.* By definition, lack of social skill is associated with a low rate of positive reinforcement.

As a result of investigating the behavior of depressed and nondepressed persons in group

therapy situations (Lewinsohn, Weinstein, & Alper 1970; Libet & Lewinsohn 1973) and in their home environment (Lewinsohn & Shaffer 1971; Shaffer & Lewinsohn 1971), a number of different measures of social skill have evolved. The measures differ in that they focus on various aspects of an individual's interpersonal behavior. Nevertheless, they embody a common rationale. Consistent with the definition of social skill, each measure of social skill is assumed to be related to the amount of positive reinforcement an individual elicits from the environment.

Action		Reaction			
Interactional Categories		Positive		Negative	
Psychol. Complaint	Psy C	Affection	Aff	Criticism	Crit
Somatic Complaint	Som C	Approval	App	Disapproval	Disapp
Criticism	Crit.	Agree	Agr	Disagree	Disagree
Praise	Pr	Laughter	L+	Ignore	Ign
Information Request	I–	Interest	Int	Change Topic	Ch T
Information Giving	I+	Continues talking about topic	Con T	Interrupts	Inter
Request for Help	Req H	Physical Affection	Phys Aff	Physical Punishment	Pun
Personal Problem	PP				
Instrument Problem	IP				
Other People's Problems	OP $< \frac{I}{E}$				
Talking about abstract impersonal general, etc.					

Content–Topics	
School	Sch
Self	X, Y, Z
Other People (group, family)	X, Y, Z
Treatment	Rx
Therapist	T
Sex	Sx

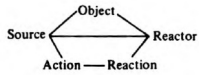

Figure 5. Behavior rating scale.

A system for coding the interactional behavior of people serves as an operational basis for the measures of social skill. The system is shown schematically in Figure 5. Behavior interactions are seen as having a "source" and an "object". "Actions" are followed by "reactions" which can be coded as either positive (i.e., expressions of affection, approval, interest) or negative (criticism, disapproval, ignore, etc.). A simplified illustration of an interaction involving four people might be as follows: *A* makes a statement (an action) which is responded to by *B* (a reaction). *B* continues talking (an action) and this is followed by a reaction on the part of C, which in turn is followed by some new action on the part of *D,* etc. Data so generated allow one to focus on any one individual in terms of the actions which he emits and the kinds of reactions he elicits. Two observers code all

interactional behaviors. The observers pace themselves with an automatic timer which delivers an auditory and visual signal simultaneously every 30 seconds. Differences between raters are conferenced. Interjudge agreement for the major scoring categories has been quite high, and is shown in Table 4. A manual for the coding system has been developed (Lewinsohn, et al. 1968).

Table 4. Estimated Spearman-Brown Reliability Coefficients for One Conferenced Rating Based on 3-way ANOVAS (10 Persons, Categories, Two Conferenced Ratings) (From Libet & Lewinsohn 1973)*

	Actions		*Reactions*	
Source	*Emit*	*Elicit*	*Emit*	*Elicit*
(A) Persons	0.995	0.774	0.956	0.973
(B) Categories	0.800	0.763	0.890	0.893
(AB) Profiles	0.851	0.634	0.956	0.914

*Winer (1962, pp. 124-132, 289) discusses the statistical basis of and outlines the computational procedures for estimation of reliability using an analysis of variance model.

1. *The amount of behavior emitted by the*

individual. A very simple but very important aspect of social skill is represented by the activity level of the individual defined as the total number of actions emitted by him (expressed as a rate per hour). We have found (Libet & Lewinsohn 1973; Shaffer & Lewinsohn 1971) that depressed individuals emit interpersonal behaviors at about half the rate of nondepressed control subjects.

2. Interpersonal efficiency. One may conceptualize the "efficiency" with which an individual interacts with other people in two different ways. *Interpersonal Efficiency-Actor* is represented by the ratio of the number of behaviors directed toward the individual (return, income), divided by the number of behaviors he emits towards other people (work, effort). If individuals *X* and *Y* each emit 100 actions during a session and *X* is the object of 80 actions while *Y* is the object of 120 actions, then *Y* gets more for

what he does than *X.* Interpersonal Efficiency-Actor looks at the individuals efficiency from the point of view of what he has to do relative to what he gets. A low Interpersonal Efficiency-Actor ratio would imply that the individual is on a low schedule of reinforcement.

Another way of looking at interpersonal efficiency is from the vantage point of the other person, wondering what he "gets" for interacting with our subject (e.g., a depressed individual). For example, if *B* (the other person) emits 10 actions to *A* (a nondepressed) person and 10 actions to C (a depressed patient), and if he elicits 20 actions from *A* but only 5 from *C* then clearly it is more "efficient" for *B* to interact with *A* than it is for him to interact with *C. C* might be said to be less reciprocal (his *Interpersonal Efficiency-Other* ratio is lower), and holding other things constant, one would over a period of time expect *B* to reduce his

interactions with *A* and to increase his interactions toward *C.* We have not been able to find systematic differences between depressed and nondepressed individuals in either Interpersonal Efficiency-Actor or in Interpersonal Efficiency-Other (Libet & Lewinsohn 1973; Shaffer & Lewinsohn 1971).

A post hoc analysis (Shaffer & Lewinsohn 1971) indicated, however, that while it was impossible to predict the direction of lack of reciprocity, the relationships of depressed individuals tended to be less reciprocal overall, i.e., the depressed individual either did much more for the other person than the other person did for him or vice versa. We intend to examine this emergent (or revised) hypothesis again with new data. One might hypothesize that to the extant relationships lack reciprocity, they would tend to be less stable over longer times.

3. Interpersonal range. Another aspect of social skill, interpersonal range, concerns the number of individuals with whom a person interacts, i.e., the ones to whom he emits behaviors and from whom he elicits behaviors.

To quantify the degree to which an individual distributes his actions equally to other members, a measure was derived from information theory (Attneave 1959). The interpersonal range measure [Relative Uncertainty Value (R)] varies from 0 to 1. If an individual emits actions to one other group member, $R = 0$, which indicates a minimum unpredictability and minimum interpersonal range. Conversely, if a person distributes his actions equally among his peers, $R = 1$, which indicates maximum unpredictability of the targets of his actions or maximum interpersonal range. Procedural details on how to compute *R* have been provided elsewhere (Libet &

Lewinsohn 1973). On the basis of small-group interaction data, the prediction that depressed individuals have restricted interpersonal range is supported for males but not for females (Libet & Lewinsohn 1973).

4. Use of positive reactions. Another aspect of social skill involves reinforcing the behavior of others toward the subject. The number of positive reactions emitted per session (holding activity level constant) is used to measure this aspect of social skill. The depressed subjects emitted a smaller proportion of positive reactions than did the nondepressed persons (Libet & Lewinsohn 1973).

5. Action latency. Another operational measure of social skill is represented by action latency, which is defined as the lapse of time between the reaction of another person to the subject's

verbalization, and another subsequent action by that subject. In order to maintain the behavior of others, it is not merely sufficient to reinforce their behavior, but this has to be done at the appropriate time, namely, in close temporal proximity to the other person's behavior. Also, the individual who delays (has a long action latency) is more likely to "lose the floor". We have found (Stewart 1968; Libet & Lewinsohn 1973) significant differences that reflect a 3:1 ratio in latency for depressed and nondepressed.

6. General comments about social skill and depression. Though the data support the hypothesis that measures of social skill discriminate between depressed and nondepressed groups, there remain many unanswered questions such as, Does the social skill of an individual when he is depressed differ systematically from that when he is not

depressed? Clinically, one can find individuals who show extreme manifestations of one or more of the above-mentioned measures of social skill. The advantage of the social skill measure is that they are quantitative and can easily be used to define goals for behavior change (Killian 1971; Lewinsohn, Weinstein, & Alper 1970). New hypotheses that have suggested themselves to us and which can be tested empirically but for which we have as yet no data are as follows:

H-l. The social skill of depressed persons is more adversely affected by size of group than that of nondepressed persons.

H-2. Being unfamiliar to others in the group has a more negative effect on social skill of depressed than of nondepressed persons.

THE RELEVANCE OF THE BEHAVIORAL THEORY OF DEPRESSION TO THE PHENOMENA OF AGING

Within a behavioral framework, depression is conceptualized as an extinction phenomena. On reading the gerontological literature one is struck by the many behavioral similarities between the depressed and the elderly person: (1) One of the most striking features of both old age and depression is a progressive reduction in the rate of behavior. The concept of "disengagement" has been advanced to account for this reduction of behavior. It is assumed to be a natural process which the elderly person accepts and desires, and which is thought to have intrinsic determinants (Cumming & Henry 1961). From a behavioral framework, the elderly person's reduced rate of behavior suggests that his behavior is no longer being reinforced by his environment, i.e., that he, like the depressed person, is on an extinction schedule. (2) Other aspects of the depressive syndrome (feeling rejected, loss of self-esteem,

loss of interest, psychophysiological symptoms, etc.) are quite common among the elderly (Wolf 1959). (3) Motivation is a critical problem in the elderly, as it is in the depressed patient. It is hard to find effective reinforcers for either. The number of potentially reinforcing events seems reduced. (4) The elderly person and the depressed person are turned inward, and focus on themselves, their memories, fantasies, and the past. The hypothesis immediately suggests itself that a reduction in the response contingent rate of positive reinforcement is a critical antecedent condition for many of the behavioral changes described in the elderly person.

We are in the process (Lewinsohn & MacPhillamy 1972) of collecting data about the following hypotheses:

H-l. The number of events and activities with

reinforcement potential diminishes with age.

H-2. The availability of reinforcement in the elderly individual's environment has diminished because of separation from children, former friends, business associates, and generally those people who have been maintaining the individual's behavior.

H-3. There are systematic differences between groups differing in age on the social skill measures, with increasing age being associated with decreasing social skill.

CONCLUDING REMARKS

The hypotheses and the conclusions that have been presented are meant to be very tentative. Our conceptualization of depression and the kinds of questions we have been asking are in a state of flux. New possibilities suggest themselves continuously and undoubtedly the hypotheses will

have to be revised and new ones developed.

We do think that we are developing methods for studying depression. Perhaps this constitutes progress.

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DISCUSSION

Dr. Seligman: I find Dr. Lewinsohn's data very rich and significant, particularly in view of my own research focus. However, I would like to address myself to the theoretical basis and particularly to the hypothesis that a low rate of positive reinforcement explains the findings. I will try to outline the reasons leading me to believe that the hypothesis of a low rate of positive reinforcement does not serve as an adequate explanation for the data at hand.

When one takes a concept such as a low rate of positive reinforcement, which after all emerges from the animal literature, there should be an empirical basis in this literature indicating that a low rate of reinforcement corresponds to his findings. That is, in the

animal one should see low activity level and low latency following a decrease in positive reinforcement before any of his clinical findings can be meaningful.

There are three lines of evidence indicating that this correspondence is not to be found in the animal literature. One is that changing the rate of reinforcement from a high to a low rate is the whole basis not of the depression literature but of the frustration literature. Indeed, that is a perfect way to generate more behavior in an animal, at least transiently and occasionally over long periods of time. One might retort in response to this contention that a low rate of reinforcement produces a chronic extinction schedule, but then I would point out that what you are describing is not truly a low rate of reinforcement but is rather intermittent reinforcement. Despite Dr. Ferster's remarks about the maintenance of the repertoire, it simply cannot be denied that animals on an intermittent schedule (or as Dr. Lewinsohn states, a low rate of reinforcement) are emitting absolutely large quantities of behavior and not low rates of behaviors similar to the depressed state. It is a well-known and documented fact that intermittent schedules are very effective in

obtaining large quantities of behavior in animals. Note, if one hypothesizes that the depressed person is on an extinction schedule, he generates a paradoxical prediction. If the person were being maintained on an intermittent reinforcement schedule (a low rate of reinforcement), and then were to be experimentally shifted to a real extinction schedule consisting of no reinforcement at all, the hypothesis forces the prediction that a depressed person would persist much longer than a nondepressed person. I suspect one would not be able to verify this experimentally or clinically, because the principles coming from the animal literature clearly tell us that intermittent reinforcement causes greater persistence.

Finally, I would suggest that the hypothesis stating that there is a lack of contingency between responding and reinforcement in the depressed subjects best explains Dr. Lewisohn's findings.

Dr. Lewinsohn: I would like to address myself to Dr. Seligman's final point. Of course, it is the temporal relationship between the behavior of a person and positive reinforcement which

I assume to be of critical importance for the occurrence of "depression". It is essential that the reinforcement be contingent upon behavior. I think it is a clinical fact that giving (noncontingently) to the depressed person does not reduce his depression; for it is not the absolute amount of attention or other "goodies" received that is critical but the fact that the environment provides consequences sufficient to maintain the individual's behavior. One might say that the depressed person is not getting paid much for what he is doing, and that it is being paid for what one does that is critical and not just being given a check. For example, in the case of the elderly person who receives his Social Security check regardless of what he does, his behavior is not being maintained by the check.

Dr. Lasky: I would appreciate some clarification on the investigation of the interpersonal range of the depressed person, which appears to me to be desirable research. Could you elaborate briefly on your work and the assumptions underlying the experiments you have done?

Dr. Lewinsohn: We define "social skill" in a circular way, i.e., as those behaviors that elicit positive reinforcement from others. We assume there

are a wide variety of behaviors used by individuals to elicit positive reinforcement from others, and we have been searching for quantitative measures with which to define social skill operationally. Our major hypothesis is that individuals who are prone to depression are less "skillful" in social, interactional situations. One of our measures (interpersonal range) was generated by the clinical observation that some depressed individuals are clearly overinvolved with one significant person to the exclusion of most other potential relationships. We are collecting data in group therapy situations about this hypothesis and certainly observe depressed individuals with extremely restricted interpersonal ranges. Our observations have also led us to hypothesize that as the size of the group increases, the participation of depressed individuals diminishes. Depressed patients appear to be more comfortable in dyadic relationships, and their behavior begins to drop off when they are in groups of more than three people.

Dr. Lasky: In your research program do you actually set up dyads or do you study dyads within a larger group setting?

Dr. Lewinsohn: Not yet. We plan to manipulate group size. On occasion we have subdivided some of our groups, which typically consist of either eight or twelve individuals, for specific tasks.

Dr. Ekman: Are you measuring verbal behavior only or verbal behavior plus nonverbal behavior?

Dr. Lewinsohn: Our data are based on verbal behavior only.

Dr. Ekman: Do you have any data to suggest that patients who interact primarily with one or two other persons in a group receive less total positive reinforcement than others who spread their interaction around among a larger number of group members?

Dr. Lewinsohn: We have the data but I cannot answer that question at this time.

Dr. Chodoff: Clinically, we know that it is not only depressive patients but almost all psychiatric patients who show deficits in their interpersonal skills and reduced interpersonal fossae. It is also the paranoid as well as the depressive who produces negative reactions in the people in his environment and who has a negative cognitive set which purports that the world is against him.

There are two aspects to Dr. Lewinsohn's research that I would like to question. The first concerns the sample selection. The portion of the sample of "depressed" people that troubles me comes from classrooms where Dr. Lewinsohn has selected those students who scored high on a rating scale which he administered.

I'm not sure that I could clinically consider these people depressed; it seems they are, at the best, mild or borderline depressives. The other portion of the sample is composed of patients who are more obviously depressed, but, again, only mildly so, for none of them are hospitalized and they are all living at home and indeed are clinic patients. I have great difficulty accepting findings based on the college students and also some reservations about the findings based on the depressed outpatient sample as indicative of the more serious "clinical" depressions.

My second question concerns the use of a rating scale as the primary criterion of depression. There are, as you know, many other ways to diagnose depressive illness in addition to the patient's own report and evaluation of his feeling state. Findings such

as anorexia, weight loss, and other somatic concerns, as well as clinical judgments, may often be entirely at variance with the mood the patient ascribes to himself.

In addition to the methodological problems, I see a historical redundancy in this approach. Dr. Lewinsohn states that depression is maintained by a lack of contingent positive reinforcement and, although the language is new, at least to me, it seems that he is talking about a phenomenon clinicians, patients, and their families have been aware of for years. This approach also has a long history as a therapeutic device. Depressed patients are told to "get out there and find something you enjoy." Or, "Go out and do it—you are not as bad as you think you are." Depressed patients receive plenty of positive encouragement and they get it until it comes out their ears, but most of them cannot use it! That depressed patients lack and want positive reinforcement is perhaps an assumption that may not be true. Profoundly depressed individuals no longer enjoy doing anything. If you force them to engage in activity, they will tell you they do not derive much satisfaction from it. This seems to be a common-sense approach which everyone takes in dealing with

depressed patients, and I might add that it is not just the families of depressed people who try this method. Every psychiatrist, whether he admits it or not, generally tries to get depressed people to engage in activity and to enjoy themselves. It usually does not work very well, however. I conclude that Dr. Lewinsohn is really systematizing, in a rather elaborate way, a type of approach which—at least in my experience—has been tried and has not proved very effective.

Dr. Lewinsohn: Dr. Chodoff focuses on an extremely important methodological point, namely, the selection of subjects in research studies on depression. As we all know, depression rarely exists in "pure" form and different researchers' operational definitions of depression and of depressed patients vary widely. In our research we employ a two-stage selection strategy using an abbreviated MMPI to screen very large samples, and then conduct semistructured interviews with those whose MMPI scores exceed certain critical levels. On the basis of the interview, the subjects are rated on some of the factors identified by Grinker. To be included as a depressed subject, a person has to have an intensity of depression exceeding a certain

cut-off score, and depression must constitute his major presenting psychopathology. In absolute terms I would place the depression level of our subjects from mild to moderate.

I would also like to address myself to the other issue raised by Dr. Chodoff, namely, the similarities and the differences between our approach and what might be called the "common sense" approach to the management of the depressed patient. I believe our approach differs in two ways. In the first place we attempt to identify those events and activities likely to be reinforcing (meaningful) for the patient and we do not assume we know beforehand which these might be. For example, we are beginning to use the Pleasant Events Schedule to pinpoint specific activities for individual patients because they are functionally related to his being or not being depressed.

The second point of departure from a strictly common-sense approach is to be found in our systematic efforts to apply reinforcement principles. We are well aware that the depressed patient often receives a great deal of advice and encouragement and that, more often than not, he is unable to use it. In fact,

depressed patients are very resistant to suggestions and sensitive about being controlled. We employ a reinforcement paradigm designed to increase the depressed person's activity level. For example, we have been using the amount of time the patient can talk about his depression, as well as the total amount of therapy time, as a reinforcement for becoming more active. Our results confirm Dr. Beck's research findings that once the person actually begins to engage in activities, he does receive reinforcement and his mood changes. The difficulty is to get the depressed person to begin to engage in activities, even though intellectually he appreciates that he should.

Dr. Friedman: Dr. Lewinsohn, if I understand you correctly you are maintaining that depression is a state of the organism and that you are addressing in your research what we might call depression of affect rather than what some of us have labeled earlier in this conference as the "clinical condition of depression." In other words, you do not see a qualitative difference between the "clinical state" and depression that sometimes occurs in every human being.

Dr. Lewinsohn: We do define depression in our research as a state that can occur in any of us in different degrees or intensities and under given circumstances.

Dr. Goodwin: The theoretical notion that depression exists as a continuum from everyday sadness to the severe ‘ ‘clinical state” is easier to maintain if one refrains from studying hospitalized patients. I find it an appealing construct, but I believe that future research will not bear it out.

Dr. Tabachnick: I would also like to respond to the criticism Dr. Chodoff raises and suggest an alternative way of viewing the situation. I agree with Dr. Chodoff's observation that much of the activity described by Dr. Lewinsohn and other clinicians is precisely what most human beings have been doing to other human beings who are called “depressed” for centuries. However, I think we are hasty in assuming that such activity by concerned friends and relatives is ineffective; after all, depressions do end. Human beings do not live outside a social milieu, and the intervention of that milieu may be one of the factors that brings a depression to a close. Perhaps our assumption that intervention of

this type is ineffective is hasty, because we are expecting the results to be direct and obvious instead of indirect and part of a general picture of improvement. Perhaps all of the cajolery and encouragement which the depressed person receives has a cumulative effect and is the significant variable in shortening or terminating the depression.

Both Dr. Chodoff's contention and my counter suggestion are only hypotheses at present, and one of the values of Dr. Lewinsohn's research is that it does represent an approach to the problem that may allow us to choose more intelligently between such widely varying explanations.

Dr. Lewinsohn: I could not agree more!

Dr. Chodoff: So far our discourse has been based on hypotheses generated on the basis of behavior only. We really have not taken into account a hypothetical construct of immense value in psychology, namely, the unconscious. In reality we discover that behavior is rather complicated and that superficial explanations are often undermined by more contradictory unconscious determinants. A person may agree that some activity or some input would

be reinforcing to him, and yet at a deeper level he may be forced to reject this input because it arouses unconscious conflicts. We do not do the complexity of human nature justice if we cling to the idea of rational man only.

Dr. Lewinsohn: There are obviously many different levels at which one can approach personality. We have found it useful to focus mainly on the depressed person's behavior.

Dr. Beck: Dr. Tabachnick has touched one of the truly positive aspects of Dr. Lewinsohn's research —the fact that it is a systematic application of positive reinforcement. I have research data to corroborate the finding that the systematic application and tailoring of treatment to the individual patient works. We have found improvement in mood after giving depressed patients "positive informational feedback," a form of reinforcement which demonstrates to the patient that he can succeed on a task which he previously predicted would end in failure.

Dr. Friedman: I would like to draw on Dr. Seligman's findings about the control issue. Dr. Seligman has demonstrated that the control of trauma

is critical in the etiology of depression, and in a similar vein Dr. Beck explained that the expression of hostility seems to be effective in depressive states because it shows the person that he can exercise control over his environment. From the therapeutic standpoint I believe we all agree that we must give the depressed person something, and I hope we can agree that the "quality" of what we give is essential.

I believe Dr. Chodoff is equating positive reinforcement with positive encouragement or with other signs of something "positive." We all know that doesn't do much good, and I believe the strategy advocated by Drs. Lewinsohn and Beck is a tribute to the necessity for showing the depressed person that he can control his world. It is not enough to sit down with the depressed person and determine with him what he thinks he would like. That can only be the first step. The second step is to devise a method to show him that he can obtain what he wants because of the power or ability or control he has. In other words, he can earn it.

Dr. Lewinsohn: Dr. Friedman not only points to some of the underlying similarities between our

positions which might otherwise be obscured by semantic differences, but he also focuses on the importance of having the depressed individual learn that he can control his environment by his own actions.

Dr. Klerman: I would like to advance the hypothesis that Dr. Lewinsohn's research sample consists of two groups. One is a group of relatively "normal" people who have a mood fluctuation as part of "normal" life. I believe it is very important to study the depressive mood as part of a person's interaction with his environment. A second group is composed of people who are suffering from an "ambulatory depression." The determinants of the relationship between external events and mood in the latter group probably are determined more by internal factors than they are among the normal people of the first group.

I hypothesize that in the first group, in which the mood seems to follow a behavior or an event, we are dealing with relatively normal people because that is indeed what we consider normal, namely, that contingent positive reinforcement promotes a sense of well-being. The second group, in whom the

mood disturbance appears to precede the activity, seems to me to characterize what empathically I feel is the condition we are observing in the clinical state of depression. Earlier I used the label "endogenous" to refer to the second group. I realize this may not be the best descriptive term for this subsample because, historically, "endogenous" has connoted biological or constitutional determination. Perhaps the concept of "depressive character" would be more appropriate than "endogenous," but I must admit I am uncertain whether the concept of the depressive character actually refers to a specific personality organization in which we see dependency, excessive requirements for reassurance, and low self-esteem, or whether it refers to a person who is perking along at a low grade of clinical depression.

I urge Dr. Lewinsohn to examine his clinical population as admixtures of these group and admixtures of depression as a normal state and as a clinical entity.

Dr. Dyrud: I am troubled that we are employing what is really a very precise language in a loose way. I believe the study which Dr. Lewinsohn has described represents more of an

empirical, Meyerian type of research than it does a Skinnerian study.

I think it might be more appropriate to use the term "response" instead of "reinforcement." The term "reinforcement" has great precision when we are looking at schedules of reinforcement, and I find it part of an interesting and challenging area of research. However, I'm not sure that the clinical field is ready for research which purports to employ the precision of the animal laboratory.

My plea to Dr. Lewinsohn and others is to use terms such as "response" and "pleasant event" instead of "reinforcement" because they are not of the same order. Perhaps when the data are more refined, we can go back and begin to study the phenomena more precisely, using a language consistent with greater precision and control.

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Notes

1 The author gratefully acknowledges the helpful suggestions

he received from Richard Diller and Douglas MacPhillamy in writing this paper.

2 While this hypothesis is not "discoverable" from the major assumptions of the theory as stated earlier, its affirmation would be consistent with them.